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Maritime search & rescue services in Nigeria : examining the Regional Maritime Rescue Coordination Centre Lagos, Nigeria

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WORLD MARITIME UNIVERSITY
Malmö, Sweden

MARITIME SEARCH & RESCUE SERVICES IN NIGERIA.

Examining the Regional Maritime Rescue Coordination Centre Lagos, Nigeria.

HASHIM BALA IBRAHIM
Nigeria

A dissertation submitted to the World Maritime University in partial fulfilment of the requirements for the reward of the degree of

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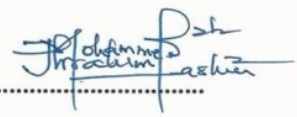
Declaration

I certify that all the material in this dissertation that is not my own work has been identified, and that no material is included for which a degree has previously been conferred on me.

The contents of this dissertation reflect my own personal views, and are not necessarily endorsed by the University.

(Signature): 
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Abstract

Title of Dissertation: Maritime Search & Rescue Services In Nigeria: Examining The Regional Maritime Rescue Coordination Centre Lagos, Nigeria.

Degree: **Master of Science**

This thesis is an examination of the Maritime Rescue Coordination Centre Lagos, with emphasis on how effective is the provision of SAR service in Nigeria. To facilitate this, a comparison with the Swedish SAR system was used.

The provision of SAR service to distressed persons at sea has always been enshrined in shipping tradition and subsequently adopted in other international treaties. However, the provision of this service was not consistent and consonant globally as well as locally within the Nigerian context. This necessitated the IMO to provide a harmonized and robust SAR system and structure in form of the International Convention on Search and Rescue,1979. Therefore, Nigeria accented to the convention to it on 23rd of June, 2002. SAR services are inevitably the last resort to distressed persons, it is activated when every other system has failed.

The increased spate of maritime accidents within the inland and territorial waters of Nigeria is becoming worrisome, hence the need to examine the system that is supposed to serve as the last option to distressed persons. This thesis examined the capabilities of the RMRCC. The study was carried out using qualitative research method, relying on existing literature reviews, descriptive and narrative experience of members of SAR organizations, as well as interactive sessions with members of the Swedish Sea Rescue Society (SSRS) during a field study of the World Maritime University in Malmo, Sweden. The study also relied on the SAR convention and the IMASAR manuals as benchmark for minimum practical requirements for an efficient SAR system.

The study observed that the SAR system in Nigeria required significant and vital reforms to provide a more efficient and effective SAR. Therefore, if the country is to harness the full potentials of the blue economy and reduce the fatalities in maritime accidents, there is a need to strengthen the National SAR policy, improve on SAR management, funding, communication facilities and enhance training of SAR personnel.

KEYWORDS: Distressed, Examined, SAR, SSRS, RMRCC, Nigeria, IMO, IAMSAR.

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List of Abbreviations

AIS	Automatic Identification System
ARCC	Air rescue coordination Centre
CRS	Coast radio station
DSC	Digital Selective Calling
EPIRB	Emergency Position Indicating Radio Beacons
GMDSS	Global Maritime Distress and Safety System
IAMSAR	International Aeronautical and Maritime Search and Rescue Manual
IMRF	International Maritime Rescue Federation
IMO	International Maritime Organization
JRCC	Joint Rescue Coordination Centre
LES	Land earth station
MA	Maritime Administration
MMIA	Murtala Mohammed International Airport, Ikeja.
MMSI	Maritime Mobile Service Identity
MOU	Memorandum of Understanding.
NAMA	National Airspace Management Authority
NEMA	National Emergency Management Agency
NIMASA	Nigerian Maritime Administration and Safety Agency
NMCC	Nigeria Mission Control Centre
NN	Nigerian Navy
NPA	Nigerian Ports Authority
NSARC	National Search and Rescue Committee
OSC	On-scene coordinator
RCC	Rescue coordination Centre
RMAC	Regional Maritime Awareness Capabilities
R-MRCC	Regional - Maritime Rescue Coordination Centre
RSC	Rescue Sub-Centre

SAR	Search and Recue
SC	Search and rescue coordinator
SES	Ship Earth Station
SMA	Swedish Maritime Administration
SMC	Search and Rescue Mission Coordinator
SRR	Search and rescue region
SRU	Search and rescue unit
SOLAS	Safety of Life at Sea
SSRS	Swedish Sea Rescue Society
UNCLOS	United Nation's Convention on the Law of the Sea
VHF	Very High Frequency

Chapter 1

INTRODUCTION

1.1 Background of study

Globally and through the course of human history search and rescue operations are characterized by distress situations and the need for assistance. And this types of operations can be conducted both on land and sea. Exploring the globe has led to unpleasant encounters with various forms of difficulties; hence the requirement to be assisted when the need arises by personnel with equipment, skills and expertise (Cooper et al., 2005). Before continuing further, some definitions of SAR include "Any operation aimed at helping someone in trouble who cannot solve his or her problem alone" (Setnicka, 1980). In shipping it is not a coincidence that the loss of about 1,600 passengers and crews in the sinking of the RMS Titanic brought the issues of maritime safety and SAR to the fore. This prompted the IMO to adopt the International Convention for the Safety of Life at Sea (SOLAS) in 1960 as a direct response to the accident with amendments in 1974.

SOLAS 1974 convention chapter V, regulation 7 requires contracting governments to provide SAR services (IMO, 2014). This also presented the sensitivity towards prioritizing human lives above properties at sea (Kopacz et al., 2001). And with more technological advancement, naval architects became more ingenious, ship building and designs became more sophisticated; with emphasis on gigantism and specializations. Ship speed, Ship sizes, passenger carrying capacities and technological innovations in shipping operations began to witness a boom. More concerns on maritime safety began to gain global attention signalling the birth of Maritime safety systems with SAR as an element (Kopacz et al., 2001). SAR is a significant element of the Maritime Safety system as it is regarded as the last available means to save lives and properties in case of an accident. Hence the emergence of more contemporary definitions such as the International Aeronautical and Maritime Search and Rescue (IAMSAR) manual definition of terms "Search" and "Rescue" separately from the other.

Search is *"An operation, normally co-ordinated by a rescue co-ordination centre or rescue sun-centre, using available personnel and facilities to locate persons in distress"*(IMO, 2019).

While Rescue is *"An operation to retrieve persons in distress, provide for their initial medical or other needs and deliver them to a place of safety"* (IMO, 2019).

However in order to carry out this operation effectively and efficiently, a system is therefore required. As reiterated by the IAMSAR manual, this system should be structured to perform certain functions such as

⇒ Receive, acknowledge and relay distress notifications from alerting posts

⇒ Coordinate search response

⇒ Coordinate rescue response and delivery of survivors to a place of safety

⇒ Provide medical advice, initial medical assistance or medical evacuation.

Therefore, SAR is an all-inclusive system made up of several other mini systems and functional components that must work together to provide a service (IMO, 2019). These primary system components are:

- Communication
- RCC
- SAR facilities
- OSC
- Support facilities

Over the years, safety in shipping has consistently improved with the International Maritime Organization's (IMO) dedication to adhering to its mission statement,

> *"To promote safe, secure, environmentally sound, efficient and sustainable shipping through cooperation. This will be accomplished by adopting the highest practicable standards of maritime safety and security, efficiency of navigation and prevention and control of pollution from ships, as well as through consideration of the related legal matters and effective implementation of IMO instruments, with a view to their universal and uniform application"* (IMO, 2020).

Figure 1: Nigeria and neighbouring countries in West Africa.

Source: (Britannica.com, 2020)

1.2 Geographical Area of study

Nigeria is located in the West of the African continent as can be seen in Figure 1 above, with its southern borders being 853km of coastline along the Gulf of Guinea in the Atlantic ocean (NPA, 2018), and falls between latitude 04010' to $06^{0}20'$ North and longitude $2^{0}45'$ to $8^{0}35'$ East. The country shares a northern border with Niger Republic and Chad Republic. While the western and eastern borders are shared with Benin Republic and Cameroon respectively both of whom share a common Search and Rescue Region (SRR) with Nigeria as shown in Figure 4. With an estimated 207,301,939 million people, spread across 36 states and its estimated by the United Nations to be about 401 million people by 2050 (World Population Review, 2020) making it largest in Africa. The country is projected to have a population growth rate of about 2.58% (World Population Review, 2020).

Endowed with about 8,575km of inland navigable waters consisting of rivers and creeks (CIA, 2013). The country is well linked with a network of rivers (significantly 2 major rivers Niger and Benue), both running from the north and meeting at a confluence city called, Lokoja. While the south is characterized by tributaries and creeks linking into the Atlantic ocean as shown in figure 2 below.

Figure 2: Map of Nigeria showing river routes.

Source: (Maps of world, 2013).

The inland waters serves as sources of economic activity such as fishing, inland transportation, and power generation. Nigeria has 8 major ports along the coastline and major navigable rivers all across the country exception of oil terminals (Buhari, 2013). Worthy of mention is that tourism is the fastest growing; with some states beginning to develop the inland waters as a tourist attraction.

1.3 Problem Statement

Maritime SAR in the past has been regarded as a less significant issue and was hitherto not given a priority to be properly addressed probably because it is seen as a voluntary obligation and an expensive one at that. However with shipping being accountable for transporting over 80% of international trade according to the UNCTAD, (2019)

reports, Humans will continuously and largely be exposed to the seas. Nigeria being a coastal state in the West African sub-region (as seen in figure 1), with vast oil and gas reserves along its coast, with petroleum and gas reserves accounting for over 90% of the country's foreign revenue (Alkali & Imam, 2016). The country is a party to various international conventions (like UNCLOS) as well as IMO conventions and instruments (like SOLAS, SAR convention) is required to provide SAR services to ships in distress. The territorial coastal and inland waters serve as a transportation mode for importation and exportation of petroleum products, agricultural products and importation finished goods into the country, as well as transboundary migration along the West-African corridors. Hence accounting for high maritime traffic.

Dogarawa (2012) reinstates the fact that there is an increasing rate of boat mishaps in Nigeria despite all regulatory measures being taken to prevent and control accidents. In recent times there has been an increase in maritime related accidents in Nigeria, according to Ukoji (2015), both authors reported that Data from Nigeria Watch had shown 1607 lives lost in 180 boat accidents between June 2006 and May, 2015.

On the 3rd day of February 2016, a domestic chartered Sikorshy S-76C++ helicopter carrying 11 souls on board ditched into the Atlantic ocean, about 75NM off the Lagos coast while heading to a Floating Production Storage, off-loading platform (Wole, 2016),(Offshore Energy, 2016). Find below figure 3 showing the removal of the helicopter during the salvage operation.

Figure 3: Picture of ditched helicopter being removed.

Source: Adopted from The Guardian Newspaper, Wole, 2016.

Another incident captured from the monthly data report of the Regional Maritime Rescue Coordination Centre, reveals the Italian MRCC/Coastguard had relayed a distress on the 1st of January 2018, about the sinking of an Italian flag vessel MT. VARIK at Latitude 03° 39.2N, Longitude 005° 04.7E with 13 crew members. Eventually on 9 crew survived and were rescued by another vessel in transit after 5 days.

In response to another incident which occurred on the 11th of August 2018, The then Chairman Governing Board of the Nigerian Maritime Administration and Safety Agency (NIMASA), reiterated that the Federal Government was coming up with innovative ideas to check the various boat mishaps. In his own words

"*The agency has already set up maritime safety volunteers (search and rescue team), who are to be deployed to jetties to assist in ensuring that safety standards are adhered to by boat operators and to also help in providing relief in times of crisis in the waterways"* (Iroegbu, 2018).

Furthermore the report of the "*Operational Assessment Mission to Evaluate the functioning of R-MRCC Lagos*" (WBS Element No. **TC/1321-19-2000**) conducted in December 2013, which was organized by the IMO, clearly indicated that although it

had acknowledged some improvements, however the R-MRCC Lagos had not been functioning as a Regional Maritime Rescue Coordination Centre nor as a Maritime Rescue Coordination Centre.

Therefore this calls for a robust, well organized, more efficient and more effective maritime SAR organization with the ability to respond timely, professionally and efficiently to maritime disasters within the inland and territorial waters of Nigeria.

1.4 Research Aims

This research is aimed at identifying possible hindrances to effective Search and Rescue services within the inland and territorial waters of Nigeria. To examine the RMRCC as a first responder and further identify the role of National SAR plans and policies, SAR management, resources, communication and other facilities play in the management and provision of effectives and timely SAR services in Nigeria.

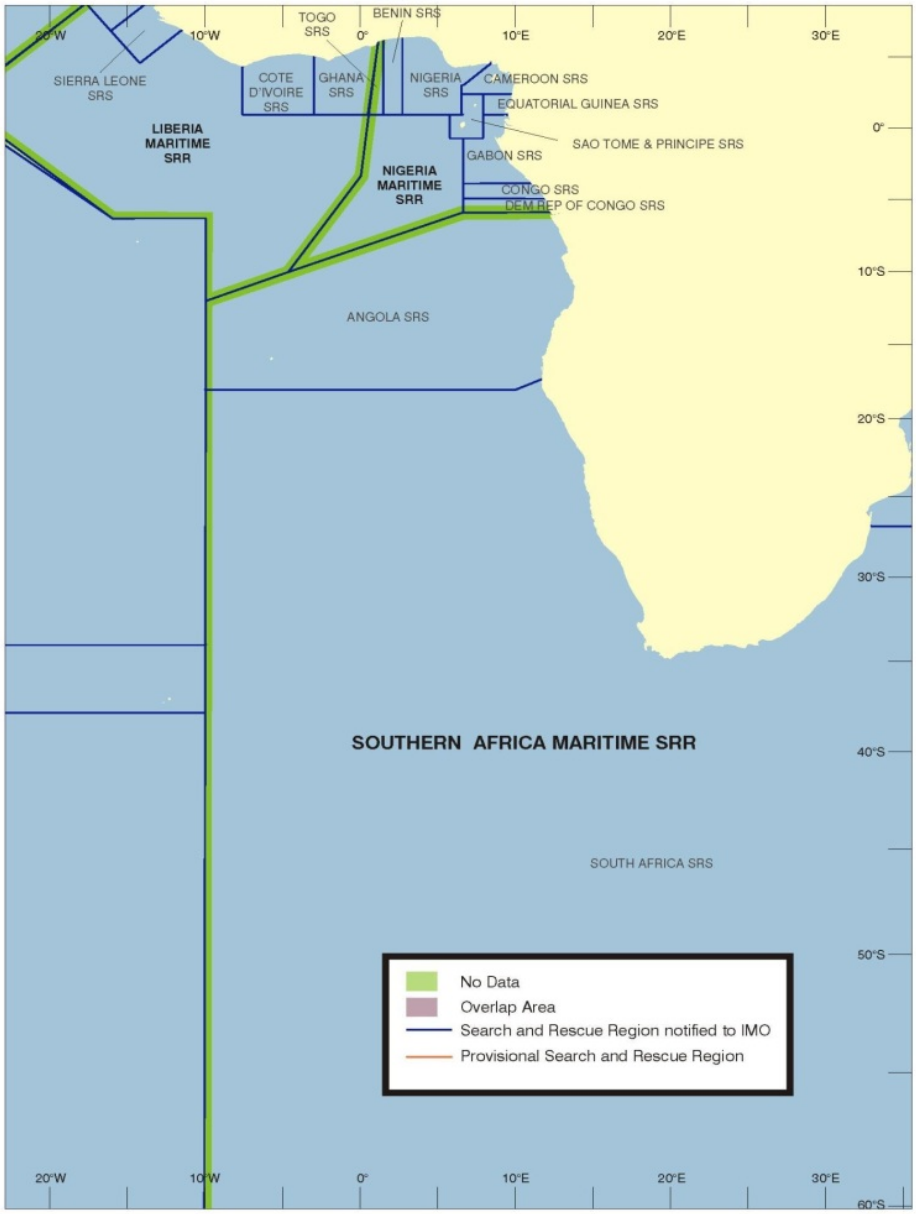

Figure 4: Map of West and Southern Africa showing Nigeria's SRR region.

Source: Adopted from IMO Global SAR plan (IMO, 2012).

1.5 Research Objectives

The purpose of this research is to:

1. Identify the current position of SAR services being provided in Nigeria with the view of identifying the present challenges being experienced by the maritime community.
2. Examine SAR management and Coordination in Nigeria. Access the country's SAR capabilities and assets in providing effective SAR services.
3. To put forward and recommend a list of measures for effective and best practicable SAR management, coordination and operational models for the Nigerian State.

1.6 Research Question

The questions necessitating this research includes

1. What is the current state of Nigeria's National SAR system?
2. How the roles of national SAR policy, National SAR plan, SAR assets, competent and trained personnel, operational and administrative bureaucracies and poor SAR coordination influence SAR services in Nigeria.
3. How to overcome the various challenges posed by the aforementioned above (para. II) in other to improve SAR services in Nigeria.

1.7 Significance of Study

"Responsible national administrating authorities must realize the benefits, opportunities and chances provided by well-established maritime search and rescue services able to provide effective assistance to those in distress at sea." (Fox, 2007).

Nigeria is a developing country and an emerging maritime nation that is continuously being explored as the population increases. The 12th largest producer of petroleum in the world, largest sub-Saharan Africa trading partner of the USA and supplying a fifth of oil imports (Badejo, 2014). Earning over 340 billion USD in oil reserves since 1970 (Otaha, 2012). Nigeria's contribution to the West African traffic remains vital to international seaborne trade with her major export contributions through highly sorted

commodities such as crude oil, cocoa, palm kernel etc. with a total of 70 percent of the total volume of cargo generated in West Africa (Buhari, 2013).

More attention is shifting towards maritime services particularly in Africa's bid to achieve economic cooperation among African countries. The economy has witnessed tremendous positive impact from the maritime sector injecting about $150 billion directly into the economy and creating over 150,000 jobs between 1960 to 2013 (Alkali & Imam, 2016).

According to the Nigeria's maritime industry forecast, the country's maritime component in its oil and gas sector is said to be worth $8 billion dollars, with another $5 to $6 billion dollars annually in the estimated cost of freight, therefore If the country is to fully harness its blue economy potentials, there will be a need to provide a coordinated policy framework to address emerging trends (NIMASA, 2018a) such as the incessant boat accidents and other maritime related incidents.

With most of Nigeria's revenue being generated from offshore oil and gas exploration accounting for about 10% of GDP and petroleum exports generating about 86% of total export revenue and a proven natural gas reserves of 5,761 billion cubic meter (OPEC, 2020). With other sectors such as the agricultural, minerals and other taxes also contributing to the revenue generation. With the increasing interest in inland water transportation which is also a source of employment and livelihood to coastal communities etc. The need to provide an efficient and effective SAR services is to say the least at an increasing demand.

1.8 Scope and Limitation

Maritime SAR system requires a passable level human, financial and structural resources. Which when compared to some West African neighbours, Nigeria ranks higher. However when compared to Sweden that has an effective voluntary SAR system, Nigeria has not been able to fully harness its potentials of an effective SAR service. On the other hand while acknowledging that Nigeria has a SAR system in place, therefore some basic functional components and frameworks exists such as RCCs for coordination of SAR, Communication facilities and networks, some SAR resources and support facilities, it cannot be compared with the SAR services and

system of Sweden. Therefore this study focused on mainly policy issues, best practices of SAR systems, SAR personnel trainings, SAR administrative and operational management, while exempting technological advancements, accessibility to high-tech SAR equipment, environmental factors and other specific aspects to make up for the differences in SAR operations and practice.

1.9 Research Methodology

This study was conducted mainly using qualitative research method, and according to Drislane & Parkinson, (2011) a "research using methods such as participant observation or case studies which result in a narrative, descriptive account of a setting or practice". Therefore the author used the legal regulatory frameworks and other instruments as a benchmark requirement for a SAR system, while comparing with the Swedish SAR system as a benchmark for international best practice of SAR model, with the aim of identifying good practices in SAR services. "*Benchmarking is an ongoing, systemic process for measuring and comparing work processes of one organization to those of another to identify best practices."* (Shafer & Coate, 1992)

1.10 Sources of Data

The sources of data collected for the purpose of this study was primarily sourced from already existing literature reviews of the Swedish SAR system. Data from published and Unpublished surveys and reports, descriptive and narrative experience of members of SAR organizations such staff and personnel of RMRCC Lagos to understand some challenges being experienced. There were some information gathered during informal interactive sessions with members of the Swedish Sea Rescue Society(SSRS) during a field study of the World Maritime University in Malmo, Sweden. The study relied on the SAR convention and the IMASAR manuals as benchmark for minimum practical requirements for an efficient SAR system and management. In addition to the author's 10 years' experience as a SAR and Duty Officer with the RMRCC in Lagos. Other sources of data include internet searches, World Maritime University library sources, some excerpts from daily activity logbook of the RMRCC Lagos, SAR

operational manuals, Policy documents, Case files of SAR operations, Newspaper publications etc.

1.11 Research Approach

The research approach taken to satisfy the aim if this topic is to use the global harmonized standards as prescribed by the SAR convention, and relevant IMO instruments as a benchmark in determining the fulfillment of a minimum requirements of a SAR system. And on the other hand examine the influence these requirements on the functionality and effectiveness of the system.

1.12 Research Data Limitation

The research was largely limited to secondary data. Due to the current global COVID-19 pandemic, there was much emphasis on social distancing, large gatherings, and travel restriction. Hence there was no little or no room for primary data acquisition. Therefore there was huge reliability on mostly online data sources.

Chapter 2

2.1 Literature Review and Historical Background of SAR.

Through the course of history, the safety levels of ships has improved significantly because of technology. Nevertheless, due to reasons beyond human control, things can still go wrong at sea. Fortunately the International community in collaboration with the IMO has established frameworks to render assistance to ships in distress.

Maritime Transport is characterized with various types of risks and navigational accidents at sea (Zhang et al., 2017), capsizing, foundering, grounding, collision, fire, man-overboard etc. are some of the most common risks associated with shipping (Dalziel & Pelot, 2019). These accidents depending on how serious, might require specialized assistance from shore to come for a rescue when the need arises. And the search and rescue of victims is usually a chaotic and crisis ridden status, requiring fast and articulate decision making often times without having a true grasp of the real situation simply because lives are at stake (Dalaklis & Raneri, 2019).

In short the shipboard itself is a risk to be on, and living on the ships further exposes seafarers to greater risks over a long period of time.

In the 18th and 19th century, these risks were quickly understood and significant loss of life was expected. Likewise coastal communities were also ready to risk their lives to save distressed sailors (Dalziel & Pelot, 2019). The tragedy of River Tyne inspired the design and construction of the first purpose built lifeboat (figure 5) in 1789 by Henry Greathead, named “the Original”, and by the early 19th Century, an estimated 1,800 shipwrecks per annum were recorded in the British Isle (RNLI, 2020). Sir William Hillary on the other hand had witnessed the treacherous nature of the sea and the plight of sailors in distress while living along the coast of British Isle, this prompted him to establish a national organization to carry out rescue along the British & Irish coast (RNLI, 2020). Likewise rescue of distressed persons at sea in Europe was also actualized by privately financed rescue organizations at local and national levels, with the First rescue boat station in the Baltic sea in 1802 being financed by Memel Mercantile Community (Fox, 2007).

Figure 5: Showing the first SAR boat ever designed.

Source: (RNLI, 2020).

SAR would eventually become a conventional responsibility as well as financial obligation by local, regional and national authorities, For example the establishment of 20 rescue boat stations along the Prussia coastlines, which was operated by pilots and managed by local authorities, eventually it became unsuccessful after a few years (Fox, 2007). In 1854 came the invention of the first cork life jacket by Captain Ward, bringing lifesaving at sea to a new dimension (RNLI, 2020). For several decades to come, countries began to adopt private SAR organizations, while some others were government funded (Dalziel & Pelot, 2019). Early 20th Century shipping had begun to witness drastic changes; advent of combustion engines, the use of radio and it's positive impact in the rescue of passengers on board RMS Republic in 1909 and its significant impact on the Titanic Rescue operation in 1912 (Dalziel & Pelot, 2019). The sinking of RMS Titanic on the 15th of April, 1912, wherein 1,500 people lost their lives would forever be commemorated by the maritime fraternity. This event would later become the significant driver for policy change that safety in the maritime world would be hinged on. In 1914, just 2 years after the RMS Titanic disaster, The Safety of lives at Sea convention was adopted.

2.2 International Legal Regulatory Frameworks for Maritime SAR.

2.2.1 International Convention for The Safety Of Lives At Sea, 1979 (SOLAS)

SOLAS is regarded as "*the most significant of all International treaties as far as safety of merchant ship is concerned*" (Dalaklis, 2017) The first version of the safety of life at sea convention was introduced and signed in London on the 20th day of January 1914, and 15 years later (in 1929) the second version was adopted; the third and fourth versions became adopted in 1948 and 1960 respectively while the 1974 version became adopted and famous for the "Tacit acceptance clause" paving the way for several other amendments (IMO, 2020). SOLAS 1974 as it is commonly known was adopted to address the growing safety concerns of shipping from design, construction, operational and functional aspects of a ship. The SOLAS convention in Chapter I Reg.3 defines the vessels exempted from its application, however Chapter V "Safety of Navigation" further defines the kinds of navigational safety services obligated to contracting governments to provide.

Whereas Regulation VII "Search and Rescue Services" Para. 1

"*Each Contracting Government undertakes to ensure that necessary arrangements are made for distress communication and co-ordination in their area of responsibility and for the rescue of persons in distress at sea around its coasts. These arrangements shall include the establishment, operation and maintenance of such search and rescue facilities as are deemed practicable and necessary, having regard to the density of the seagoing traffic and the navigational dangers and shall, so far as possible, provide adequate means of locating and rescuing such persons*" (IMO, 2014).

2.2.2 United Nation Convention on the Law of the Seas, (UNCLOS).

The United nations convention on the law of the sea (UNCLOS) was first adopted by the United Nations in 1958. Haven entered into force in 1994 with 157 signatories, it is also known as the "Laws of the Seas". It was adopted by the international community to regulate uses of the oceans, its resources and thus bring a stable order to mankind's very source of life. UNCLOS is an important international legal instrument for maritime Search and Rescue. It proffers obligations to flag states and coastal states in providing maritime search and rescue services.

Article 98 “Duty to render assistance” para.2, obliges;

“ Every coastal State shall promote the establishment, operation and maintenance of an adequate and effective search and rescue service regarding safety on and over the sea and, where circumstances so require, by way of mutual regional arrangements cooperate with neighbouring States for this purpose.”

2.2.3 International Convention on Maritime Search And Rescue (SAR), 1979.

The International Convention on Maritime Search and Rescue (SAR, 1974) also known as the “Hamburg convention” was described by Fox, (2007) as *“Milestone in the development of global SAR”*. Although the duty of Coastal states to perform SAR operations was incorporated in both UNCLOS and SOLAS, there was no International system that governed the implementation of SAR operations before 1979 adoption of the SAR convention as opined by Tauman, (2002). The convention proscribes a well detailed management, coordination and execution of SAR service by setting up an internationally formal and uniform approach to SAR. Another objective of the convention was to have every maritime space covered with SAR service; and therefore in order to achieve this the world’s oceans and seas were divided into Search and Rescue Regions (SRR) as per agreements reached by parties to the convention (Gombeer & Fink, 2018).

The convention was adopted on the 27th of April 1979 in a conference in Hamburg, and entered into force on the 22nd of June, 1985. This first adoption could not acquire enough ratifications which subsequently paved the way for several other amendments. According to the IMO; the aim of this convention was to develop a well-coordinated International maritime SAR plan to rescue distressed persons at sea in respective locations, by a SAR organization or International cooperation between SAR organizations (IMO, 2020). The 1979 SAR convention tried to achieve this by dividing the oceans into 13 search and rescue areas, and imposing considerable obligations including setting up of shore based facilities and installations. However these obligations and several other issues such as the experiences of other states that had already implemented, significant questions and concerns that were also raised by the

developing member states; Amongst other reason set up the tune for the non-ratification and less acceptance of the convention and other treaties (IMO, 2020). Wherein in the case of those who ratified, there was also slow pace of implementation of the convention. It was generally accepted that the Convention itself needed to be overhauled and amended. By the 18th of May, 1998, the IMO through resolution MSC.70(69) amended and adopted the International Search and Rescue Convention 1979. Which entered into force in January, 2000.

The 1998 Amendments was very significant in revolutionizing SAR operations. It clarified the responsibilities of government with "*emphasis on regional approach and coordination between maritime and aeronautical search and rescue operations*" (IMO, 2020) and defined basic elements of SAR service which are;

- Legal framework.
- Assignment of a responsible authority.
- Organization of available resources.
- Communication facilities.
- Co-ordination and operational functions.
- Processes to improve the service including planning, domestic and international co-operative relationships and training (IMO, 2020).

Notably was the harmonization of maritime and air search and rescue operations that eventually produced the International Aeronautical and Maritime Search and rescue (IAMSAR) manuals. Parties then accepted responsibility for providing search and rescue services for a specified area with the latest amendments adopted in 2004 and entered into force in 2006 (IMO, 2020).

2.2.3.1 The International Aeronautical and Maritime Search and Rescue (IAMSAR) Manual.

The International aeronautical and Maritime Search and Rescue (IAMSAR) manual is a three volume (I, II and III) publication of a joint collaboration between the International Civil Aviation Organization (ICAO) and the International Maritime Organization (IMO) in developing an internationally recognized SAR manual. The

manual aims to provide states with a theoretical assistance in meeting their SAR needs through the implementation of SOLAS and SAR Conventions. To encourage regional cooperation with a view to consider their SAR services as part of a global system, and nurture inter-organization collaborations between aeronautic and maritime administrations (IMO, 2019).

2.2.3.1.1 The International Aeronautical and Maritime Search and Rescue (IAMSAR) Manual Volume I.

The Volume I of the IAMSAR manual deals with Organization and Management of SAR. Provides guidelines to governments and designated authorities in establishing, managing and supporting SAR services. Likewise it give direction on the integration of national and regional SAR systems into the global SAR system.

2.2.3.1.2 The International Aeronautical and Maritime Search and Rescue (IAMSAR) Manual Volume II.

Volume II deals with mission coordination of SAR operations, with emphasis on communication systems and safety systems that are significant in a SAR system. This volume also tries to introduce response to various SAR incidences, describes various emergency phases and planning required for SAR operations as well as search techniques and search facilities. It provides both theoretical and practical application to SAR theories, challenges, and how to overcome these challenges.

2.2.3.1.3 The International Aeronautical and Maritime Search and Rescue (IAMSAR) Manual Volume III

This volume is also called the mobile facilities manual. It is expected to be carried on board mobile facilities (aircrafts, ships etc) and other rescue units. It provides assistance to these mobile facilities involved in performing SAR operations and carrying out OSC functions.

2.3 International Convention on Salvage, 1989.

As per chapter II, article 10 of the International convention on Salvage 1989, “Duties to render assistance” obligates “every master is bound, so far as he can do so without serious danger to his vessel and persons thereon, to render assistance to any person in danger of being lost at sea”. Clearly this article of the convention passes the right to

provide SAR services to distressed persons at sea to the Master of a vessel, so far his vessel or persons on board the vessel are not in harm's way.

2.4 National Legislations and legal Frameworks on SAR in Nigeria.

Nigeria has two (2) national legal instruments legislating SAR operations in the country namely;

- Nigerian Maritime Administration and Safety Agency (NIMASA) Act
- Nigerian Merchant Shipping Act.

2.4.1 Nigerian Maritime Administration and Safety Agency (NIMASA) ACT, 2007.

The Nigerian Maritime Administration and Safety Agency (NIMASA) Act was enacted in 2007, and SAR was legislated under part iv., "function and powers of the agency*"22.- (I) The functions and duties. of the Agency. shall- be to : (f) provide search and rescue service;*" (NIMASA Act, 2007).

2.4.2 Nigerian Merchant Shipping Act.

The Merchant shipping Act was enacted into law in 2007 to deal with merchant shipping and related matters. Part XVI "Safety of Navigation", Section 279 "Search and rescue regulations" (NASS, 2007) allocates powers to the Minister to establish RCCs and provide SAR regulations for all Nigerian flagged vessels and organizations to follow.

Chapter 3

3.1 National SAR Policies, Authorities and Cooperation.

In establishing a SAR system the IMASAR manual proposes the formulation of national SAR plans and polices, it subsequently provides road maps to both maritime and aeronautical organizations on how to provide SAR, as well as SAR organizational management, coordination and operation.

A national policy on SAR is expected to identify third party organization or agencies vital to the provision of SAR services. It should establish standards, provide direction to such organizations/agencies and stakeholders as well as implement the National SAR plan. National policies also reflect a states' dedication and commitment to the provisions of SAR. While also domiciling the managerial and coordinating powers (either by legislations, decrees or policies) to a specific authority to manage. For example. A maritime administration, coast guard or the Navy as the case may be. Although the IAMSAR manual recommends national SAR policies to be formulated, as well as the establishment of cooperation amongst SAR providing stakeholders. This cooperation can be entered into at regional levels. Where a coastal state is not equipped with sufficient maritime assets, it can benefit such assets through bilateral or multilateral cooperation (Gullett & Shi, 2015) and this by extension also applies to SAR resources. Likewise such cooperation can be strengthened through informal and formal meetings, visitation and secondments (Gullett & Shi, 2015). Other merits of multilateral cooperation includes economic reasons (Wang, 2006), elimination of duplication of effort, and uniformity in provision of SAR services. However there are no standardized guidelines in formulating such policies and co-operations; hence states adopted guidelines and road maps that may differ based on political, social-economic and environmental externalities. For instance, Nigeria is largely off shore oil and gas exploration nation, with lots of critical infrastructure on her relatively warm coastal waters, while Sweden on the other hand is endowed with cold coastal waters and relative no off shore explorations. Rather the country is more involved in recreational and tourist activities. Both SAR policies would reflect the environmental and socio-economic peculiarities of the respective countries.

3.1.1 Sweden's National Policy on SAR

Sweden is a signatory to the SAR 1979 convention having entered into Force in June 1985, while SOLAS, 1974 entered into Force in May 1980. The Swedish Maritime Administration (SMA) established in 1871, is the delegated agency responsible for managerial and coordinating obligations. The Swedes have adopted the multi-agency approach of a SAR system as recommended by the IAMSAR manual Vol I, and has SAR functions being carried out by other organizations through a National Agreement signed in 1981 based on the SAR 1979 convention (Amghar, 1986). The SMA has an operational organogram and structure complying with the provisions of the IMASAR manual (Wang, 2006). The SMA has a national agreement with 10 other agencies and organizations, like the Swedish Sea Rescue Society (SSRS), the Civil aviation, Customs coast guards, the Navy, etc. This group of organizations together form the Swedish National SAR coordinating committee, with laid down procedures for all participating organizations in SAR operations (Wang, 2006).

3.1.1.1 Joint Rescue Coordination Centre (JRCC) Gothenburg.

Sweden's SRR is divided into 14, with the Maritime and Aeronautical Rescue Co-ordination Centre (ARCC) located in Gothenburg. It provides 24 hours services in maritime traffic reporting and surveillance, SAR co-ordination and other services on international coastal waters, lakes and inland waters. The JRCC oversees the SRR and has international SAR agreements with all its neighbours (Amghar, 1986) exception of Denmark (Wang, 2006) while it is also participating in all the SAR plan of the Baltic and North Sea (Amghar, 1986) as well as other surveillance cooperation for maritime crimes (Gullett & Shi, 2015). The JRCC at any point in time is manned by two (2) SAR duty officers with additional personnel support on standby and readily available when needed. One (1) of the SAR duty officers is assigned as the SMC and is responsibilities are as per the IAMSAR manual section 1. (SMA, n.d.) Notably, Sweden empowers the SMCs with the powers to deploys SAR resources and SRUs. Denmark and Canada likewise give the SMCs the powers to deploy SAR resources (Wang, 2006).

3.1.1.2 Swedish Sea Rescue Society (SSRS).

The SSRS is a voluntary organization with 130,000 members, and 2,200 Volunteer crew members from various professional backgrounds. Collectively accounts for over 80% of the all sea rescues in Sweden. The society is privately funded through membership dues, donations and voluntary work and is operationally available 24 hours along the 2,400km Swedish coast.

3.1.2 Nigeria's National Policy on SAR

Similarly, Nigeria is also a signatory to the SAR 1979 convention which was assented to on 23rd of June, 2002 and the SOLAS 1974 convention which was assented to on the 7th of August 1981. Therefore by this action, as a contracting party to both IMO conventions is obliged to provide SAR services to seafarers in distress along its coastal and International waters. Furthermore as a national obligation to citizens as well as a fulfilment of the legislative function, Nigeria is therefore expected to provide SAR services to inland waters.

The Nigerian Maritime Administration and Safety Agency (NIMASA) is by legislation responsible for Maritime administration and by extension provision of SAR services in Nigeria. The IAMSAR manual recommendation of multi-agency approach was adopted, leading to the signing of a Memorandum of Understanding with other organizations and agencies such as Nigerian Navy (NN), the Nigerian Airforce (NAF), Nigerian Police Force, Nigerian Immigration service, Nigerian Custom Service, National Emergency Management Agency (NEMA), Nigerian Airspace Management Agency (NAMA), etc. This system (Wang, 2006), argues that it is bureaucratic and complex, especially when so many agencies are involved. However the author is of the view that if the managerial powers are legislatively vested in a coordinating agency the complexity and bureaucracy will be minimized.

While on a regional level, Nigeria being the regional head of the SRR, hosts annual SAR Technical committee meetings in conjunction with the IMO and the International Maritime Rescue Federation (IMRF). The essence of such meeting is to strength bilateral cooperation in the SRR as well as provide technical support among member states through IMO's assistance, much of the outcome of such meeting has always not lead to productivity on ground. Nigeria is usually left with the burden of being solely

responsible for coordination. While other members of the SRR in some cases do not even have dedicated SAR offices, or national frameworks as the case maybe. This was observed at several Technical cooperation meetings where the author was a member of the secretariat.

3.1.2.1 Regional Maritime Rescue Coordination Centre.

The responsibility to host the R-MRCC in the context of the October 2000 Florence Conference, has been worked out in the Multilateral Agreement with all 8 countries in Lagos SRR, signed on 27th day of May 2008, the same day R-MRCC Lagos was commissioned by the then IMO Secretary General Admiral Efthimios Mitropoulos. Figure 6 below shows a picture of the Plague in honor of the commissioning of R-MRCC Lagos. To fulfil the earlier mentioned responsibilities in chapter 1.1, the first and most important task is to operate a well-functioning MRCC on a 24 hour basis, 365 days a year. While in 2002, a report by IMO officials, and a technical tour by Jens Grytten A.S of Norway, proposed the establishment of RSC and JRCC in accordance with the recommendations of the IMO/ICAO on joint rescue coordination. This necessitated the decision of NAMA to host the JRCC at the Murtala Mohammed Airport, (MMIA) Lagos. Furthermore, RSCs are established in order to facilitate SAR coordination therefore it is not a coincidence that 4 more RSCs where established namely RSC Bonny, RSC Oron, RSC Escravos and RSC Lokoja. Nevertheless, not all RSCs where commissioned (Ibrahim, 2018). At the time of the commissioning of the R-MRCC Lagos, it was compliant with the minimum requirements as set out in the SAR, 1979 convention para 2.3.2.

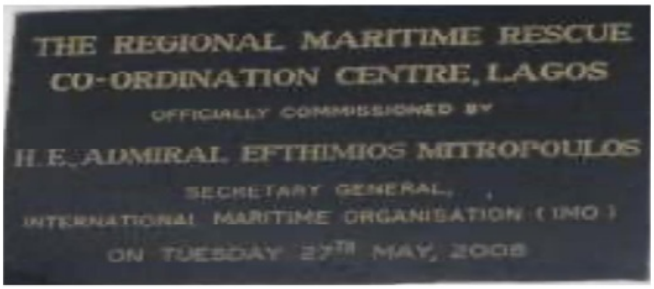

Figure 6: Plague commemorating the commissioning of RMRCC Lagos.

Source: Photograph taken by the Author.

The RSCs at Bonny, Escravos and Oron, are supposed to control and coordinate SAR operations of SRUs along the southern coastal waters. It was intended for the RSCs to also relay rescue information from MRCC for onward transmission to the respective SRUs, who will in turn direct it to other SRUs/SAR Marshals closest to the incident areas (On the scene coordinating units). While the RSC Lokoja is supposed to control and monitor operations on the inland waters in conjunction with SRUs on the inland waters. The RSCs are required to monitor all SRUs directly, ensure their equipment are functional, receive information from ships, aircrafts, other maritime sources and at the end of all operations; collate and transmit all SAR activities from these SRUs to JRCC/MRCC as the case may be. Although some of these centers are equipped and manned, but unfortunately none of the RSCs are functioning or running effectively as proposed and hence it is not a coincidence that the report of the "*Operational Assessment Mission to Evaluate the functioning of R-MRCC Lagos*" (WBS Element No. **TC/1321-19-2000**), which was organized by the IMO categorically stated that "none of the dedicated SAR units is fully functional and that the R-MRCC Lagos had not been functioning as a Regional Maritime Rescue Coordination Centre nor as a Maritime Rescue Coordination Centre".

3.1.2.2 Search and Rescue Marshals.

Nigeria recognizes the use of voluntary SAR organizations, notably called the "SAR Marshals" an equivalent of the SSRS. Unlike the SSRS, the SAR Marshals are however paid monthly stipends as incentives while performing these duties. This is also a laudable system that involves the local indigenous fishers and ferry boat operators. NIMASA provides the SAR Marshals with basic SAR training as well as lifesaving appliances for SAR operations. But the recruitment process of the Marshals is not standardized. The scheme is also not clearly defined and NIMASA does not have any formal operational and coordinating procedures guiding the Marshal.

3.2 Organizations of Available Resources

With reference to the IAMSAR manual Vol I, "Primary resources of a SAR organization are the operational facilities made available to it by various authorities".

Available resources for SAR systems can be in various forms, shapes, sizes and functions. The definition of resources according to Cooper et al., (2005) can be in form of personnel or equipment accessible for designated SAR incidents. The authors opined that a resource can be "anything or anyone" of grandness in a SAR event, and this can also be referred to as "SAR asset". Further ascribing "a Fisherman with a fish-finder" as a likely SAR resource in the event of an incident. Hence the lack or non-availability of these resources remains one of the biggest conundrums of SAR organizations (Kibuuka, 2006). This underpins the huge role played by SAR resources as therein lies the reliability in providing an efficient and effective SAR service. While also acknowledging that no SAR organization can have all the required resources, the IAMSAR manual Vol I also recommends "States should use existing facilities to the fullest extent possible" further buttresses the international principle for providing SAR which employs the use of "all available resources" (USCG, 2004). Likewise the IAMSAR manual volume II also recommends that states request for resources from international sources whenever necessary. Every SAR operation is different therefore every operation requires its own unique planning, resources as well as execution. On the other hand, the availability of SAR resources does not connote to provision of an effective SAR service, it must be understood that while a state or organization has all available resources and does not have proper coordination of such resources is tantamount to failure, inefficiency and poor performance. Therefore in as much as SAR resources are vital, their management, coordination and deployment to the right operations are equally vital to achieving results. The basic SAR resources needed for a SAR system includes Search and Rescue Units (SRUs), Communication facilities, personnel and other support services.

3.2.1 Search and Rescue Units

SRUs can be ranging from the very big equipment to a small equipment. For example aircrafts or boats. However, big or small, it is a common understanding that no single SAR organization/state has complete SAR assets of its own. Chao Wang (2006), pointed out the influence of SRUs on the performance of SAR operations, and with particular reference to SRUs owned and controlled by the RCCs and RSCs.

Furthermore, the author also agrees with the fact that the SRR's goods and services, climatic and weather conditions, as well as economic capabilities, largely would determine the kind of SRUs available.

3.2.1.1 Sweden's Search and Rescue Units.

Sweden has divided its SRR into 15 areas, placing each of under the supervision of "Traffic area director", who in turn is responsible for ensuring sufficient availability of SRUs are provided in collaboration and cooperation with other SAR organizations such as the SSRS (SMA, 2020). With reference to Chao Wang's 2006 survey, Sweden has good procedures in place when it comes acquisition and coordination of SRUs in responding to SAR cases, rather the challenge the SMA faces, is more of which SRUs should respond to which SAR incident. The SSRS has over 73 rescue stations with its headquarters and administrations in Gothenburg. In its fleet, the SSRS has 230 boats (SSRS, 2020) including 11 meters covered boats (used all year round), 8 meters open boats, and small Ski rescue runners. All coast stations are equipped with one of each. While the SMA boast of 7 helicopters in 5 bases, several boats and SAR personnel, including the JRCC personnel. Pictures below captured by the author shows some of the SAR resources owned by SSRS during the WMU students field study trip in Malmö. All SAR boats are equipped to the IAMSAR manual recommendations.

Figure 7: Picture of the SSRS's 11 meters covered outboard engine boats.

Source: Captured by the Author at a Field study trip in Malmo.

Figure 8: Interior photos of the SSRS's 11m covered boat.

Source: Captured by the Author at a Field study trip in Malmo.

Figure 9: The SSRS's Ski rescue runner.

Source: Captured by the Author at a Field study trip in Malmo.

Figure 10: SSRS's 8 meters open SAR boat

Source: Captured by the Author at a Field study trip in Malmo.

3.2.1.2 Nigeria's Search and Rescue Units

Although presently Nigeria has a couple of SRUs when compared to other members of the Lagos SRR. At the regional level, it was observed by the author during the Lagos SRR technical committee meeting organized by IMO in conjunction with IMRF that most member states within the SRR do not have dedicated SRUs. While some others depend largely on voluntary organizations and artisanal fishers to provide assistance to distressed persons at sea.

Figure 11: Ariel photograph of some SRUs at the SAR base in Lagos.

Source : Adopted from NIMASA, 2019

Figure 12: A photograph of Nigeria's 16meter covered SAR boat "Millennium I".

Source: Photograph taken by the Author.

The table below was adopted from Chapter 24, (NIMASA, 2018b) listing the SRUs and their capabilities.

AGENCY	SAR UNIT	SIZE / SPEED	RADIO/NAV/ RADAR	ENDURANCE
NIMASA	AUGUSTA BELL HELICOPTER			
NIMASA	MILLENIUM 1 SAR BOAT	16meters/20knots	Yes	150NM at cruising speed
NIMASA	MILLENIUM 2 SAR BOAT	16meters/20knots	Yes	150NM at cruising speed
NIMASA	OFURE	28meters/24knots	Yes	300NM at cruising speed
NIMASA	BAYELSA	18meters/40knots	Yes	100NM at cruising speed
NIMASA	BENUE	18meters/40knots	Yes	100NM at cruising speed
NIMASA	PUBLIC PRIVATE PARTNERSHIP (PPP) BOATS			

Table 1: SHOWING THE SPECIFICATIONS OF NIGERIAN SRUs

SOURCE: ADOPTED FROM (NIMASA, 2018b).

However, all the above listed SRUs are situated in Lagos, leaving the RSCs depending largely on other sources, mostly private owned shipping companies and IOCs. Although most of the listed SRUs cannot be ascertained to be fully sea worthy, as the

author could not have access to maintenance records of the SRUs. But information from anonymous sources confirmed that one of the SRUs was on dry-docking maintenance repairs, nonetheless most of the SRUs are in dire need of maintenance and overhaul. Similarly, the report of the *Operational Assessment Mission to Evaluate the functioning of R-MRCC Lagos*" (WBS Element No. **TC/1321-19-2000**) also indicated that only one (1) of the SRUs was partly operational. Also the SRUs cannot carry out minor maintenance repair work due to the lack of dedicated spare part stores that would support minor repairs, hence minor repairs are often left unattended until spare parts are purchased. Further reducing the chances of a standby boat ready for call out as well as delay in response time.

The Nigerian SAR organization also has other assets listed below

- 1 AgustaWestland AW 139 Helicopter (See figure 12)
- 2 Toyota Hilux Operational vehicles
- 1 newly installed AIS/RMAC system (See fig 20)
- 1 NAVTEX (Non-functional)
- 2 INMARSAT Explorer 500 BGAN satellite telephones. (Non-functional)
- 1 INMARSAT C terminal
- 1 DSC VHF, MF, HF Transceiver (See figure 19)
- 2 VHF Transceivers for monitoring VHF channel 16 (See Figure 19)
- 2 GSM mobile phones
- 6 Desktop computers for outside communications
- A total of 25 staff. including Radio communicators.

With reference to SAR assets and resources, Nigeria is no doubt going to be faced with shortage in SAR assets and resources in the future. Going by the continuous increase in human population and expansion of intermodal transport system including inland water transportation.

3.2.1.2.1 The AgustaWestland AW-139 SAR helicopter

The AgustaWestland AW-139 SAR helicopter pictured below in Figure 13 was purchased between 2008- 2010 solely for the purpose of SAR operations within the SRR. During its flying days, it was effective in the conducting SAR operations and

was also used to patrol coastal waters. However, one of the fundamental challenges faced by the SAR unit was the inability to conduct night flights and night SAR operations.

Figure 13: Picture of Nigeria's AgustaWestland AW-139 SAR helicopter.

Source: Adopted from NIMASA.

In the early days of its operation, one of the SMC in a private chat with the author, had expressed the fact that Nigerian airspace does not permit helicopter flights after 1800hrs, hence this was limiting their capabilities to perform night operations. Although other challenges began to crop up such as the recruitment of pilots. During a routine discussion with a young commercial helicopter pilot, it had become clear that pilots professional competence requires flight hours clocked. Hence recruiting a young and active helicopter pilot to fly a SAR helicopter in a relatively low coastal SAR activity area like Lagos SRR would be in contrast to his career and professional progression. The flight hours clocked would rather look insignificant to the time spent in commercial capacity. This was also a problem the maritime administration faced at the early stage of operating the chopper. Eventually pilots recruited on several occasion had to resign and seek for other jobs not as a result of financial terms but rather as a result of profession and career progression. Presently, the maritime

administration has seconded the chopper to the Nigerian Navy. All efforts to seek for the new terms of operation have not yielded effort as at the time of writing this thesis.

3.2.2 Search and Rescue Personnel

The most important part of the SAR system is the people (Ovaska, 2003). The people drive the system to produce results, likewise the system relies on people for it to be able to perform its functions. A SAR system is comprised of both administrative, operational and support services. And therefore require personnel with various skill sets for the system to function appropriately. Why the IAMSAR manual Vol does not mandate states on what specific skill sets are required to man a SAR system it however provides a structure for general staffing considerations.

Table 2: SHOWING IAMSAR MANUAL RECOOMENDATION FOR SAR SYSTEM STAFFING OVERVIEW.

SAR requirements	Functional areas	Positions
Establish national or regional SAR systems as part of the global SAR system	Develop legislation Arrange to use resources Provide resources Establish SRRs with RCCs Establish SRSs with RSCs Provide staff Train personnel Ensure adequate communications Develop plans and agreements Form SAR committees.	SAR coordinators and managers, administrative staff and support staff within the state's administration
Receive distress alerts	Monitor common means of alerting Acknowledge distress alerts Relay distress alerts to the RCC	Communications watch standers at alerting posts and RCCs
Coordinate SAR service	Relay distress alerts if necessary Acknowledge alerts if necessary Coordinate response Plan SAR operations	SMC with support of staff at RCC or RSC

	– Alert and dispatch SAR facilities – Assign OSCs and OSC duties – Prepare SAR action plans – Provide medical advice – Document each case	
Conduct SAR operations	On-scene coordination Search Rescue Medical evacuations	Personnel aboard SRU and other Mobile facilities.
Support SAR services	Support SAR facilities and personnel Training Communications Supplies Facility maintenance	Logistics and support managers, administrative and training staff, suppliers, maintainers, computer operators, communications providers etc.

SOURCE: ADOPTED FROM IAMSAR MANUAL VOL I

Looking at the above staffing overview, it is therefore pertinent to note that the staffing requirements of a SAR system is rather based on the functions of the system. Aside from the staffing the RCCs to conform to functions, it is desirous to have personnel with other attributes like dedication to rescue, persistence, experience, good communication ability, integrity and honesty. Therefore a wide range of staffing skill set is required. Although some functions could be merged together and carried out by a personnel with complimenting skill sets.

3.2.2.1 SAR personnel in Sweden's RCCs and SSRS base stations:

Dee Norton of the USCG in an article "Benchmarking the Coast guard Sar system against the world best" conducted a survey of 6 countries including the UK. The survey revealed that 4 out of the 6 had a 7+1 watch standers (7 watchkeepers and 1 supervisor) and the remaining 2 countries had 5+1 watch standers for a 12 hours shift. Further information gathered during the WMU field study to the SSRS confirmed that Sweden actually now runs a 5+2 watch standers with the 2 supervisors (Each represents Air and Maritime SMC).

Countries	Staffing standard (Number of watch standers + supervisor)
United States	5+1
Australia	7+1
Canada	5+1
Hong Kong	5+1
Netherlands	7+1
Sweden	7+1
United Kingdom	7+1

Table 3: STAFFING STRENGTH OF WATCH STANDERS AT OTHER RCCs.

SOURCE: ADOPTED FROM USCG, 2004.

The table below was adopted from the survey carried out indicating the countries and numbers of watch standers. While the SMA conducts SAR coordination, the SSRS actually boasts of the operational personnel. SSRS has over 2,200 volunteer personnel from various works of life. Personnel of the SSRS are saddled with responsibility of conducting SAR operations mainly along the coastal waters.

"*The USCG has a staff dedicated to coordinating SAR planning and operations separate from the other possible missions with the RCCs"* (Howard, 2004). This further explains that right number of personnel are required by RCCs and RSCs in other to curb personnel over stretching and fatigue (which subsequently leads to poor situational awareness and poor judgement).

3.2.2.2 SAR personnel in Nigeria's RMRCC, JRCC and the RSCs.

The mini organogram in Figure 9 represents the structural system of the RMRCC Lagos as at the time of writing this dissertation. Indicatively, the support services is separated from the RMRCC. Hence administrative and operational reporting is done separately.

Figure 14: A mini-organogram of staff structure of the Nigerian SAR system.

Source: Adopted by the author.

The SAR system has a total personnel strength of 25 (including the Head of SAR unit (SMC), duty officers, SAR officers and other personnel at the RCCs and RSCs). A breakdown of personnel distribution across the RCCs and RSCs is shown in the chart below. In contrast to practices in other countries listed above in Table 3, MRCC Lagos runs 2 shift of system (Day and Night) 9 and 15 hours respectively and a 3+1 watch standers per shift. While the JRCC is run on a 2 shift bases in addition to staff of the MMIA. On the hand the RSCs do not have a standard shift and personnel rather this RSCs rely on District Surveyors as contact persons in case of an incident. While some RSCs are also not staffed completely.

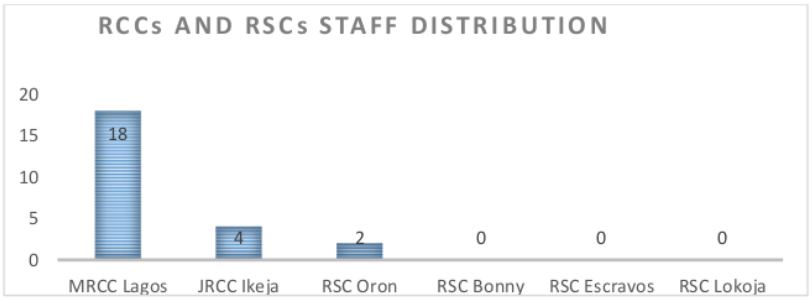

Figure 15: Graphical representation of staff distribution.

Source: Adopted by the Author

The chart above indicates that staff distribution of the RCCs and RSCs is inadequate and unbalanced.

3.2.2.3 Personnel of the Nigerian SRUs

The support services team of the NIMASA SAR unit saddled with the responsibility of manning the SRUs has a total personnel strength of nine (9). The team is expected to man 5 SAR vessels listed above in Table I, crew members are also expected to perform administrative duties while not inactive. The boat crew are administratively reporting to another unit as illustrated in Figure 14 above. Most crew members of the SRUs are certified, competent and qualified with the required mandatory seafaring certificates.

3.2.3 Personnel Training

Training is essential to the performance of a SAR system's personnel. SAR operations require vast knowledge and experience. Well trained personnel reduces operational inefficiency and increases effectiveness as well as increases performance, and survival chances when faced with difficult challenges. Although as earlier emphasized, a SAR system is characterized by different personnel with different skill sets who would therefore require different trainings. These trainings are determined by SAR requirements, functions and positions. For example training requirements of a SRU/boat crew will be different from the requirements of a SAR duty officer/controller. Although the IAMSAR manual is vague on the modalities of training, but on the other hand it recommends training specifics such as who, what, when, where and how to train. On the other hand the Dee Norton pointed out USCG has formal and on-the-job training schedules for SAR controllers. These personnel are expected to undergo a graduate course of Maritime SAR (course duration of 3 weeks), then proceed for on-the-job training (6weeks) at the RCC after which a written and oral test will be conducted to evaluate knowledge acquired in SAR planning and coordination (USCG, 2004).

3.2.3.1 SSRS Personnel Training

Although the SSRS is a voluntary service, members go through a recruitment process lasting between 6 – 12 months before being called out for rescue operations.

SSRS personnel have lower grade of commercial certificate like Class A in both deck and mechanical for commanders, Sea rescue courses conducted internally with SMA on Basic SAR and Advanced SAR.

While all crew members on the other hand run Basic SAR courses and personal security class courses. It must be noted that the SSRS and SMA's SAR courses are shorter courses unlike the STCW. These courses provide less focus on firefighting, and more intensity on Basic maritime safety and survival. However the Ski rescue runners and the 8 meters boats have special courses for the operators. Duration of these course take about half a year because volunteers are studying on part time bases. All members are also required to attend practical classes with examiners accessing them.

SSRS conducts train the trainer courses as well, this enables the transfer of basic SAR knowledge at local levels for new members before having a more centralized training. The only mandatory certificate that requires renewal is the medical certificate. Nevertheless, the SSRS personnel continuously upgrade and increase knowledge on basic SAR as new guidelines and regulations are published by IMO and SMA.

3.2.3.2 Nigerian SAR Personnel Training

As per chapter 23 of the NIMASA SOP, 2018. There are specified training requirements to be provided for SAR personnel. These include:

i. SAR on-scene coordinator
ii. SAR Mission coordinator
iii. GMDSS training
iv. French language training.
v. Artisanal fishing training.
vi. Training on SAR boat handling.
vii. Track and Clue Awareness (TCA).
viii. Swift Water Rescue.

Checks revealed from anonymous sources confirmed that there has been a review of the training requirements although not yet updated into the SOP. This includes:

a. Standards Of Training, Certification And Watchkeeping For Seafarers (STCW)
b. Basic Offshore Safety Induction And Emergency Training (BOSIET)
c. Helicopter Underwater Escape Training (HUET)

Nonetheless, a preliminary check on the list of staff training requirement suggests that although majority of the staff have been trained GMDSS GOC certified operators (including the author), all trained personnel are due for re-training. Figure 16 shows a copy of the author's GMDSS GOC certificate. The Nigeria SAR system also boasts of some personnel that have been trained and certified by the IMO and other globally recognized SAR institutions.


NIGERIAN MARITIME ADMINISTRATION AND SAFETY AGENCY
MINISTRY OF TRANSPORT
NIMASA
GMDSS - GENERAL OPERATOR'S CERTIFICATE
Awarded to
IBRAHIM HASHIM BALA
Upon satisfactory completion of approved course conducted
From
To
Date and Place of Birth
Discharge Book Number
Signature of Holder
Date of Issue
Signature of Duly Authorised Official
This certificate is issued as evidence of attendance at a course of training in GMDSS-General Operator's Certificate covering the requirements set out in regulation IV/2 of the International Convention on Standards of Training, Certification and Watch-keeping for Seafarers (STCW), 1978 as amended.

Figure 16: Picture of the GMDSS GOC certificate of the Author.

Source : c

3.2.3.2 Training of Nigeria's SRUs Personnel

SRU personnel require constant training and exercises to keep them alert and professionally competent seafarers as well as to be able to overcome various challenges of SAR duties and operations. Again, crew members while having a chat with the author expressed anonymously that, even though they were employed with basic minimum requirements of a seafarer, they are usually not trained and often are

not exposed to new technological developments as regards to safe navigation. Hence most of crew members resort to self-funding to actualize competence and career growth. On the other hand, these courses are expensive and require some sea going time, which again makes it difficult to actualize without the support of the Maritime administration.

3.3 SAR MANAGEMENT AND ORGANIZATION

SAR management is key to building a successful SAR service. A SAR system is combination of various systems, therefore it can be quite complex and hence the need for efficient management in other to harness its full potentials and objectives. Management requires taking decisions on the activities to be carried out and assigning people to carry it out, while this can be achieved through organizing, planning, decision making, leading, communicating, motivating and controlling (Eze, 2015). As per the IAMSAR manual Vol I, SAR management can be divided according to functions, namely administrative and operational.

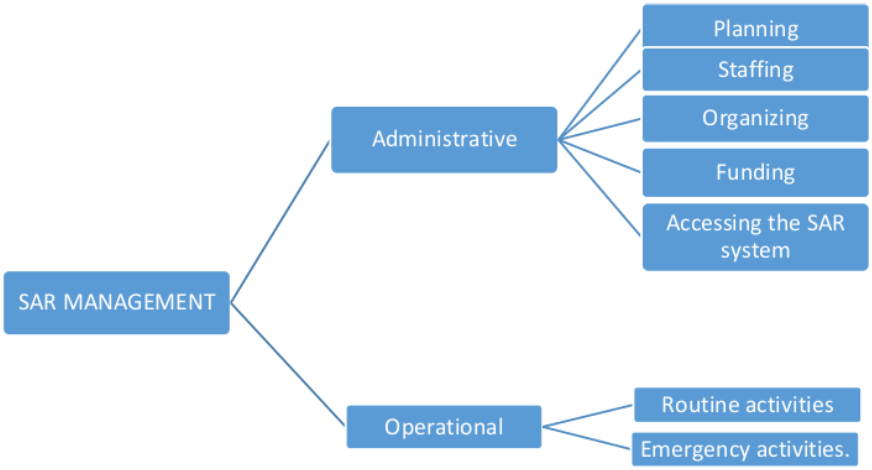

Figure 17: Basic SAR Management and its functions.

Source: Adopted by the Author

From the illustration above, it can be deduced that a SAR system's performance would depend largely on how well the system is managed, therefore the management of the

system is vital to not only the system but by extension portrays the image of the organization and the member state in general. According to the IAMSAR manual, the establishment of RCCs and RSCs is a responsibility of SAR managers in addition to staffing organizing, planning as well as other non-operational routines like training, policy formulation and legal fund sourcing.

3.3.1 ADMINISTRATIVE

A SAR system requires administrative management to function effectively. Some administrative responsibilities of the SAR system includes planning, staffing and importantly funding. IAMSAR manual Vol I recommends the sharing of administrative duties. Explaining further that the delegation of such duties in SAR organizations ensures proficiency in operations, and aids personnel readiness in SRRs with low SAR activity. Furthermore, the administrative duties cuts across all cadre of personnel including RCC chiefs, SMCs and RCC staffs. The various levels of hierarchy determine the various levels of administrative duties to be carried out. However the bulk of the Administrative issues rests on the RCC chief. The issue of funding and resource management cannot be under estimated. SAR is a very expensive venture, and requires high financial management skills. In addition to funding, SAR managements are required to appropriate resources and budgetary provisions for various SAR activities, develop and update SAR agreements and policy documents, maintain SAR library, data base, plans and manuals. Establish and maintain close contact with international, regional or national SAR contacts and SAR resource providers. Prepare, supervise and monitor SAR training schedules. The urgency of SAR operations cannot be predicted, the system should be designed to avoid needless bureaucracy and processes. Administrative management of SAR is highly critical to the future development of the SRR, hence the need for the system to be assessed and proffered with solutions that will enhance effective and efficient SAR systems in general.

3.3.1.1 Administrative Management of SAR in Nigeria

The Maritime administration in Nigeria is a civil service structured agency. Administrative responsibilities are divided into 3 divisions as can be seen in figure 18

below, and are headed by Executive Directors. Each division is further subdivided by its functions. Therefore SAR is a function of the operations divisions under the directorate of Maritime Safety and Seafarers Standard. SAR is headed by an Assistant Director, and should be the SC as per IAMSAR manual recommendation. While other sub-units exists under this directorate, the chain of command requires that all operations must be routed to the head of the directorate before being carried out. However, the issues relating to the provision of emergency services should be treated with urgency and less bureaucracy.

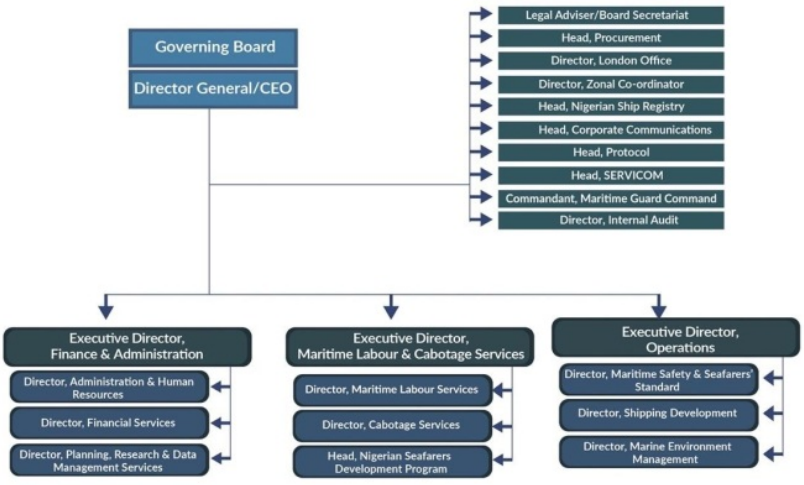

Figure 18: The Maritime Administration Structure

Source: Adopted from (NIMASA, 2020)

3.3.2 OPERATIONAL

The operational aspect deals with mainly the coordination of SAR operations, it is a more practical phase of SAR management. It should be as seamless, efficient and effective as possible. However SAR operations do not usually go exactly as planned, considering that it is usually characterized by chaotic and distressed persons in panic.

3.3.2.1 Sweden Operational procedures

The operation system of SAR in Sweden is divided into 3, namely SAR management, Mission co-ordination and mobile facilities (SMA, 2020), the managements is responsible for mostly administrative issues like policy formulation, management of

international cooperation, participation in international activities as well as supervise the JRCC. While the coordination is handled by the SMA, under the auspices of the JRCC in Gothenburg together with other organizations like the Swedish coastguard, Navy etc. (SMA, 2020). Interestingly the Swedish coastguard seldomly participates in SAR activities, they are often time more involved in environmental protection issues like oil spill detection and response on the Swedish coast.

According to Wang (2006), Sweden had proven to have a good SAR coordination and operational procedure in place, which the author suspects is attributed possible due to their system of voluntary SAR organizational structure. During a field study program with the SMA, the resource person reiterated that SAR coordination is done by the SMA. Majority of the operational responsibility is passed on to the SSRS. The SSRS conducts over 85% of the SAR operations in Sweden. However, the remaining percentage is carried out by other agencies and "vessel of opportunity" according to the SSRS resource persons. Below is the operational organogram of the SMA.

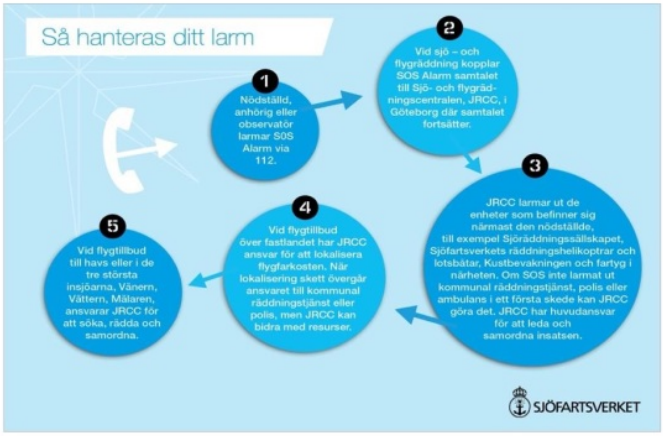

Figure 19: Showing the operational procedures of the SMA.

Source: Adopted from the Swedish Maritime Administration, n.d.

A translated version of the operation diagram in figure 19 explained further reveals that at

Stage 1: Distressed relative or observer alarms SOS Alarms via 112

Stage 2: For sea and air rescue, SOS alarm connects the call to the Sea and Air Rescue Center, JRCC, in Gothenburg, where the call continues

Stage 3: JRCC alerts the units that are closest to the person in need, for example the Maritime Rescue Society, the Swedish Maritime Administration's rescue helicopters and pilot boats, the Coast Guard and ships in the vicinity. If SOS has not alerted the municipal rescue service, police or ambulance in the first stage, the JRCC can do so. The JRCC has the main responsibility for leading and coordinating the effort.

Stage 4: In the event of a flight incident over the mainland, the JRCC is responsible for locating the aircraft. Once located, the responsibility passes to the municipal rescue service or police, but the JRCC can contribute resources.

Stage 5: In the event of a flight incident at sea or in the three largest lakes; Vänern, Vättern, and Mälaren, JRCC is responsible for searching, rescuing and coordinating.

In addition, the SAR controllers have the authority to dispatch SRUs with the permission of the supervisors who are the SMCs. Response time in SAR is important and vital to chances of survival. The SSRS SRUs and the SMA SAR helicopters have a response time of 15 minutes from the receipt of the distress call to arrival at the scene of incident. This means that the Swedish SAR system coordination, mobilizes SRUs or helicopters within a quarter of an hour upon receipt of distress.

3.3.2.2 Nigeria's Operational procedures

The R-MRCC Lagos has 5 operational SAR stages and planning procedures listed in the (NIMASA, 2018b).

- Awareness stage.
- Initial action.
- Planning
- Operations
- Conclusion and debriefing.

The process is well defined at every stage. The operational procedure for RMRCC is

illustrated below, this is a guidance to the operational procedure expected to be followed by the Duty officers when receiving and coordinating a distress communication. This to a large extent is usually followed by the duty officers and supervisors. But on the other hand, administrative bureaucratic processes often time delay response time as well as exhibits poor performance and eventually non execution of operation. Furthermore, this operational procedure does not capture inland water SAR activity. Probably due to the fact that inland SAR infrastructures are under developed in the country, however there is need for the integration of inland SAR operations into the RCC operational structure.

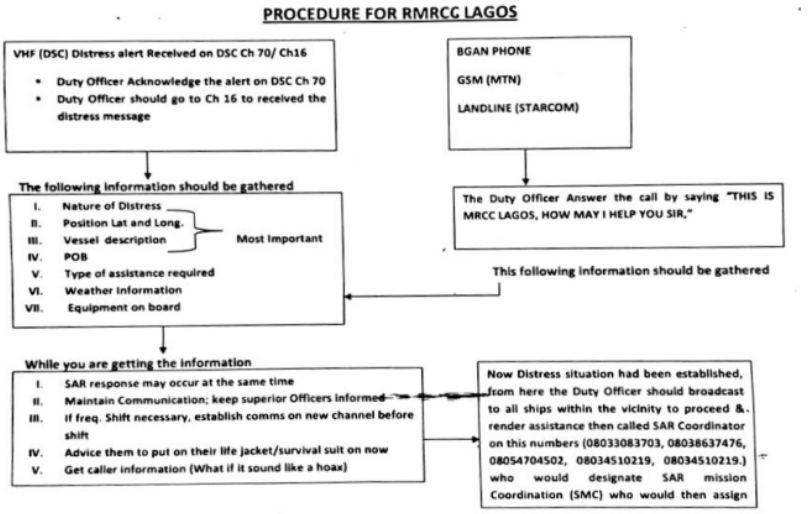

Figure 20: Operational procedure for RMRCC Lagos.

Source: NIMSAR SAR unit.

Distress received is processed by the Duty officer, who extracts vital static, dynamic and voyage information. The details extracted will then be plotted and forwarded to senior officers via GSM phones who then assign an SMC. The SMC will be responsible for coordinating the mission, however he would be required to assign an On Scene Coordinator (OSC). The OSC would usually be a nearby vessel or an oil platform depending on the location of the distress. While the duty officer is expected

to maintain communication with distressed vessel or distress relaying vessel. The process as seen is not capturing the roles of SRUs.

3.4 COMMUNICATIONS FACILITIES

Communication is an essential element of every SAR system and operations. For a SAR system to be able to operate efficiently, it must possess the ability to communicate, in other words it must be able to receive, understand and relay as well as send out information in a timely and efficient manner.

It is indicative of the fact that the Greeks and Chinese made the first discoveries in relation to communication, however the Greeks having a more developed society in Europe, paid more attention to this knowledge (Poole, 2003). The first successful attempt in shipping to use the wireless technology was in London by an Italian inventor known as Guglielmo Marconi, with the Navy and other organizations such as Lloyds endorsing it (Poole, 2003). Hence radio communication has been the foundation of the distress and safety systems used by ships at sea since the first instance of the use of radio communications in 1899 to save lives at sea. However through the course of history this systems came with certain challenges and inadequacies such as

a. Maritime distress relied primarily on the capability of the ship in distress to alert another ship for assistance and assistance was only possible if both ships were within range and capable of receiving distress.
b. Human error complications that were associated with sending distress signals, calls and messages.
c. Time taken by the navigator to measure and calculate incident positions may create a enough time-lag, as well as delay response time thereby allowing for more tragedy and destruction.

The conclusions from these reviews and the advances in technology led the IMO member states to develop the new system based on the modern technology and automation. Hence the proposal of the Global Maritime Distress and Safety System (GMDSS) was adopted.

3.4.1 Global Maritime Distress and Safety System (GMDSS)

"The basic concept of the new system is that search and rescue authorities ashore, as well as shipping in the immediate vicinity of a ship in distress, will rapidly be alerted to a distress incident so they can assist in a coordinated search and rescue operation with the minimum of delay" (Kent, 1990)

The GMDSS system is an integrated communication system using satellite and terrestrial radio communication system. This communication system has contributed to the rapid development of maritime safety as well as satellite radio communication (Kopacz et al., 2001). The SOLAS 1974 convention as amended by its protocols 1978 and 1988 established the GMDSS, and by 1999 became the deadline for all mobile and terrestrial stations to comply, ushering Radio communication into a new era on the 1st Feb, 1999. GMDSS uses radio communication in alerting and notifying SAR organizations, coast stations and ships within the vicinity of a distress or any type of emergency as may be declared. Its serves as a source of MSIs to ships. GMDSS consists of several equipment such as Navtex, VHF DSC, Inmarsat C, EPIRBs, etc.

3.4.2 Communication system in Sweden's SAR system.

Sweden has a wide variety of communication systems. Covered entirely with 56 VHF base stations and 5 medium wave stations (SMA, 2020). The SSRS is equipped with various means of both terrestrial and satellite communication systems such as Mobile phones, pagers and beepers, VHF radios, and GMDSS equipment. With a coastal radio station that transmits on VHF, MF, HF and mobile telephone. Find attached Status of Shore based facilities for GMDSS as provided by members states to the IMO GISIS platform (See appendix A). This further indicates that Sweden has DSC alerting for Sea area A1, A2, and Ship Earth Station (SES) and Navtex system all operational in the RCC. Appendix B shows Sweden's 3 Navtex service coast stations as fully operational.

3.4.3 Communication system in Nigeria's SAR system.

Nigeria also boasts of some of the installations used by the Swedes and can be seen in MRCC Lagos, however not all of the equipment are functional. Likewise at the RSCs, some of the communication equipment installed are not effectively functioning, hence interconnectivity with the RCCs is difficult. Majority of the RMRCC communication

to the outside world is done via GSM telephones and emails. It must be mentioned that the MA has recently embarked on a complete overhaul of the communication facilities of the SAR structure in general. But the picture painted by the IMO GISIS platform for the GMDSS Status of Shore-based facilities provides a different interpretation. It is indicative of the fact that although the country may have installed some GMDSS facilities. This information captured by the IMO GISIS report attached in this thesis as appendix A and B is perhaps indicating a different reality. The report captured reveals that Nigeria has No operational DSC alerting for Sea area A1 and A2, A3 and A4. There is also no Inmarsat C , Inmarsat fleet F77, No SES for RCC. Nonetheless, the report indicates there is a Navtex system being "planned or to be decided", in actual fact the report on Appendix B identified 2 Navtex coast stations of Nigeria as "planned or to be decided". While the COSPAS – SARSAT Mission Control Centre (MCC) and Local User Terminals (LUT) are fully operational and is very often times relayed to the MRCC by NMCC NEMA. (See appendix C).

In the GMDSS setup, the initial acknowledgement of the receipt of a distress message on the DSC should be by a coast station. Ships are only required to acknowledge receipt of a distress message by voice or telex on the follow up frequency. The subsequent actions and communications are controlled and coordinated by the assigned RCC. Below is a photograph of some of the communication equipment installed at the RMRCC Lagos operation room. It is equally fair to mention that Nigeria is reeling from unreliable power grid, and therefore power fluctuations have been a contributory factor to the loss of valuable communication equipment previously

installed.

Figure 21: Picture of some functional communication equipment like DSC VHF, MF/HF Transceiver, VHF radios and a Nonfunctional NAVTEX transceiver at the MRCC Lagos.

Source: Photograph taken my Author.

Equally notable is the availability of 2 standby generators for emergency power generation and back up, however these power backups are not designed to automatically start working when power cuts out. The generators require being manually operated by power duty officers on watch at the operation centers. Other causes of such equipment loss was from the lack of thunder and lightning arrestors, For example the Centre lost an equipment donated to it by the US coastguard through a lightening that struck the building while the system was working. Also the Inmarsat Explorer 500 (BGAN) terminal, operational at the time of commissioning the R-MRCC is no longer operational.

3.5 OTHER AVAILABLE RESOURCES AND GOOD PRACTICES.

3.5.1 AUTOMATIC IDENTIFICATION SYSTEM AND THE REGIONAL MARITIME AWARENESS CAPABILITY

The IMO in 2000 adopted the Automatic identification system as part of the SOLAS convention Chapter V, regulation 19. Initially it was intended as a collision avoidance aid, nevertheless it's demand has since evolved with coastal states using its application on territorial waters (Rahman, 2016). Technological advancement also impacted on the need for safe navigation through technical infrastructures on shore side, like the VTS, radar stations, AIS, etc. that provide constant monitoring, guidance and traffic

information for ships within a port facility or through a water way (Dalaklis et al., 2009). Since the AIS provides real time static, dynamic, voyage related data and short messages about vessel status, to shore-based facilities and other vessels equipped with same technology (Rahman, 2016), it therefore becomes a useful tool for SAR operations. Although the AIS is not a GMDSS equipment, it is notwithstanding a widely explored equipment is maritime safety. Nigeria has recently installed the technology at the C4i command center, hosted in the same structural building with the RMRCC (pictured in Figure 15). The state of the art facility is expected to compliment the activities of the Maritime Administration's goal in Maritime Safety, Maritime Security and Shipping development. This facility is coming at the heels of increased levels of violent and armed maritime crimes in the Gulf of Guinea. Furthermore, the system is also structured to consist of a response unit that will consist of Fast intervention vessels to combat maritime crime and ensure enforcement.

Figure 22: Showing the newly installed AIS/Regional Maritime Awareness Capability system.

Source: Photographs taken by the author at the NIMASA C4i unit.

Nevertheless this state of the art facility will also be an important a tool for the SAR Unit in achieving an effective, efficient and timely response to distressed persons at

sea. It is left to be seen if the MA would in-fuse the SAR unit into the scheme or second the surveillance technology to provide information necessary for the rescue of distressed persons at sea.

3.5.2 SAR AWARENESS CAMPAIGNS

The MA in trying to provide cooperate social responsibility to various inland and coastal communities introduced a the yearly SAR awareness campaign. This is usually conducted annually. Coastal and inland water communities are educated, provided with basic maritime safety equipment and training on safety practices and culture. This has been commended by several stakeholders and should be encouraged. This annual campaign has enlightened the communities and has established an excellent working partnership with the NIMASA SAR unit as well as it has promoted technical cooperation with boat operators in these communities.

Chapter 4

4.1 OBSERVATIONS AND RECOMMENDATIONS.

4.1.1 NATIONAL SAR POLICY, AUTHORITIES AND COOPERATION.

4.1.1.1 Observations

SAR service is a collective effort and should be seen as a national service. Therefore members of any National SAR committee should be enlightened to understand this fundamental principle. The National SAR plan does not reflect the responsibility and roles of NSAR committee members in the case of an emergency. While it was also observed that the present NSAR plan is completely oblivious of inland water SAR service, no strategic plan, policy or procedures for inland water SAR.

The NSAR plan does not capture some critical stakeholders, ministries departments and agencies (MDAs) that can contribute to SAR service. For example, The Ministry of Communications, Nigerian Communication Commission (NCC), State Water Transport Authorities of riverine and coastal communities, etc.

At the regional levels, there is insufficient co-operation among SRR members. The staff of the R-MRCC do not exercise and conduct drills with the Regional partners of other member states associated with the Lagos SRR and therefore lack proficiency in this specific field. There is no Regional SAR Plan in place for SAR services, as well as a regional plan for training and exercises. The following is thereby recommended at the Regional level:

I. Regional level cooperation should be intensified in conformity to the multilateral agreements as this would allow regional members the opportunity to gain experience and proficiency. Secondments and attachment programmes as well as regional training and drills should be designed and encouraged.
II. Regional. Although the involvement of the IMO and IMRF has started to bring the regional SAR partnership to life.
III. Regional SAR Plan is developed and members should be encouraged to develop their national SAR plans and integrate same with the regional SAR plan.

While at the National level the following is recommended

I. The NSAR plan should be revisited to provide a more defined role and responsibility for members during emergency times.

II. The NSAR plan show capture policies and plans for Inland water SAR operations and procedures.

III. There is a need to establishment of more RSCs especially around the major rivers in Nigeria, and to further harmonize all RSCs fill in the gaps as regard inland water SAR service.

IV. The NSAR plan should be enlarged to accommodate more stakeholder like the Lagos state waterways authority, MDAs such as Ministry of Communications, etc which can provide a key SAR infrastructure within inland waters so as to improve response time in rescuing distressed persons.

4.1.2 THE SAR MARSHALS PROGRAMME

4.1.2.1 Observations

The SAR marshal programme is in fact to say the least a very laudable system, as it has proven to effective in Sweden. The weaknesses observed include lack of established procedures for recruitments, political interference with the recruitment process due to the non-standardization. No policy documents or established guidelines in recruiting volunteers as such, there is often tendencies for them not to be accorded the cooperation by members of the public. Insufficient training for Marshals and lack of checks for excesses and other violations. and balances. Hence I recommend;

I. The system attracts local knowledgeable partners and boat operators of the coastal and riverine communities, therefore, the system should be encouraged and expanded to cover more states of the federation.

II. The process of recruitments should standardized and devoid of political interference as this denies the opportunity of recruiting truly dedicated SAR personnel with passion to do the job. And should be nationally certified.

III. Marshals should be provided with training, and a harmonized national basic SAR course and certification programme that will be conducted and monitored by the MA.

IV. The activities of marshals should be checked by introducing supervision and control from the RSCs within their jurisdiction.

4.2 OTHER AVAILABLE RESOURCES.

4.2.1 Search and Rescue Units

4.2.1.1 Observations

SRUs are often times the first responders and OSCs, whenever a distressed is relayed. As regard the distribution of SRUs, It was observed that were lopsided distributions of the SRUs. Likewise availability of SAR boats for operations was also noticed to a problem as only one boat was reported to be functional according to the *Operational Assessment Mission to Evaluate the functioning of R-MRCC Lagos*" (WBS Element No. **TC/1321-19-2000**) corroborated by anonymous sources. There was also the issue of maintenance of SRUs. Often times little maintenance work are delayed due to lack of dedicated spare parts store for quick fix repairs. As per the helicopter, it was observed that crewing and legislation was a fundamental issue for the continues operation of the helicopter, although it was not ascertained by the author as to what conditions and on what terms it was seconded to the NN. Recommendations are therefore proposed as follows

I. The distribution of SRU is fundamental to immediate response, SRUS should be provided for RSC and proper maintenance record should be provided for all SRUs.
II. SRUs should be provided with minor maintenance spare parts and storage for crew members to be able to conduct minor repairs as at when due.
III. The Helicopter pilot and crew should be recruited and engaged with other flying activities such as patrols and enforcement duties when not on SAR duties. A rotational system for pilots can be introduced with the view of curbing redundancy among the pilots.

4.2.2 SAR PERSONNEL (SRU and Supporting Staff)

4.2.2.1 Observations

Personnel distribution at various RSCs was observed to be either under staffed or completely unmanned. There is a shortage of staffing observed especially at the RSCs,

while acknowledging that the RCCs are not doing badly with the 3+1 watch standing model, but can be better considering the Swedish model 5+2 (watch standers and supervisors respectively). While the same challenge is being experienced by the SRUs, the requirement of more crew members cannot be left unchecked as it would hamper a great deal of operational proficiency and performance. However inarguably there is an urgent need for more staff to provide the requisite support both administratively and operationally in order to provide efficient and effective SAR. Therefore in the light of the above observations, I would recommend as follows

I. That an urgent need for staffing of the SAR system be made with the MA, while SAR managers are able to identify skills gap that is required to fill in the shortfalls in staffing requirements.

4.2.3 Training (SRU and Supporting Staff)

4.2.2.2 Observations

The system is required to be in a state of readiness always, this constant level of readiness requires several personnel to be trained, certified and qualified. Training provides basic knowledge, certification provides authorization of capacity, while qualification formalizes the individuals ability of serve in a certain capacity. When compared to the SSRS, there is a huge training gap that is required to be filled, both at Sar management level (both administrative and operational). The training models and recommendation as per the NIMASA SOP, 2018 is requiring an update. There is a need to look at trainings that are structured for SAR personnel, and provide such trainings tailored to suit staff functionality. Recommendations are as follows

I. It is recommended that the staff of SAR and the crews of the SRUs train, exercise and conduct drills on a regular basis to gain sufficient experience and proficiency.
II. Training improves alertness, prepares the mind to face unexpected challenges while on operations, therefore all SAR personnel must be exposed to minimum basic SAR course and should be made to take advanced SAR courses at certain cadres in their working careers.

III. SRU personnel should be exposed to more technologically advanced navigational systems and equipment that will update their knowledge and navigational skills.

IV. All SAR personnel (especially SAR managers and Operational personnel) should be encouraged to go on secondments and exchange programmes to other elites SAR organizations such as the SSRS, USCG, and RNLI in other to gain exposure modern and best international practices in SAR operations.

4.3 SAR COMMUNICATION FACILITIES

4.3.1 Observations.

SAR communication is vital to a successful SAR operation. Communication among the various SAR facilities should be dependent on local arrangements as well the availability of equipment at the disposal of the SRR. However efforts should be made to provide more available options to enhance better communication within the SRR on a bare minimum. It was observed that the MA has very limited communication ability within the SRR, and shore based facilities that have been observed to be installed did not have an effective inter connectivity with SRUs and other RSCs. Although the MA is committed to installation of more communication facilities, the issues of interconnectivity of the RSCs and SRUs is important. The revelation from the GISIS portal should be taken seriously and matched with good action. Almost all equipment on the GMDSS set up were not captured on the GISIS portal. The R-MRCC does not have functional a NAVTEX transmitter, which is important in the dissemination of MSIs, as well as the Inmarsat C system was non-functional. Other supportive communication systems such as the Inmarsat Explorer 500 (BGAN) terminal, operational at the time of commissioning the R-MRCC is no longer operational. Power is also major contributor to loss of equipment and subsequent breakdown of communication. The following recommendation are proposed

I. It is recommended that RCCs and RSCs in the SRR be equipped with DSC equipment to receive and acknowledge DSC Alerts from within the Nigerian SRR on VHF, MF and HF, and ensure that both RCCs, RSCs and SRUs are

interconnected and can communicate among themselves seamlessly.

II. All Centers should be equipped with a NAVTEX transmitter to promulgate Maritime Safety Information (MSI) within the Nigerian SRR.

III. The SAR management should explore more communication options that could be provided for the SAR system.

IV. It is recommended to involve the Federal Ministry of Communications and the NCC in providing a national SAR emergency number that will be quick to channel information to the right SAR resources for quick response to accidents.

4.4 SAR MANAGEMENT AND ORGANIZATION

4.4.1 Observations on SAR Management

The SAR administration is a vital responsibility that must be carried out diligently. Funding, Planning, policy formulations and staffing requirements are fundamental to decision making process of provision of SAR service. It has been observed that SAR managers are dedicated to a good SAR service, considering the fact that most SAR managers in the system have gained experience either as seafarers or as administrative personnel in the maritime administration. However, it appears that the challenges faced are more of organizational and would require an improvement in the overall level of service. Planning Funding, budgetary requirements and financial expenses of SAR operations are of utmost importance. The functionality of emergency services is placed under excessive bureaucratic process. Operationally on the other hand the present operational procedures stops short of providing more details as to what other actions a SMC should carry out as regards SAR distress.

In view of the observations above, it is recommended that

I. SAR and other forms of emergency services should be devoid of bureaucratic processes that could hinder swift and efficient response, therefore a new operational chain of command be introduced that would empower the SC to authorize the conduct of SAR operations.

II. SAR operations are capital intensive and therefore require funding and financial support, the SAR managers should be allowed to determine the budgetary provisions required for the fiscal year.

III. SAR managers should also be provided with the required training and exposure to new SAR management courses, as this will expose managers to internationally best practice model of SAR management.

4.5 Good Practices

The SAR management must be commended for projecting good programs such as the SAR marshal initiative and Safety Awareness campaigns. It has no doubt gone a long way in the provision of life saving appliances, training, technical support and enlightenment of water transport users as well as encourage boat and ferry operators to adhere to safety measures in other to curb marine accidents . In view of the aforementioned gains, it is therefore recommended that such laudable initiatives and programs be sustained and expanded to cover more locations and coastal communities. The MA must also be commended for the new installed C4i system which is expected to deployed to the fight against maritime crime and improvement of the overall maritime safety and security of the Nigerian coast. Therefore, it will be recommended that the MA should encourage the C4i system to integrate a working relationship with SAR in other to provide necessary information required during SAR operation.

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Appendices

Appendix A Status of Shore-based Facilities for the GMDSS

O = Operational
T = Under trial
P = Planned or to be decided

GMDSS
ANNEX 1

ANNEX 1
STATUS OF SHORE-BASED FACILITIES FOR THE GMDSS

Country	COAST STATIONS					SES	MSI BROADCAST SERVICE					Cospas-Sarsat	
	DSC			Inmarsat LES				SafetyNET			HF		
	A1	A2	A3 & A4	C	Inmarsat Fleet F77	for RCC	NAVTEX	NAV	MET	SAR	NBDP	MCC	LUT
Montenegro	O	O				O							
Mozambique	P	P											
Myanmar	O	O	O										
Namibia													
Netherlands	O	O		O	O		O			O			
New Caledonia (France)						O		O					
New Zealand			O			O		O	O	O		O	O
Nigeria							P					O	O
Norway	O	O		O	O		O	O	O	O	O	O	O
Oman	P	P	P				P						
Pakistan	P	P	P					O	O	O		O	P
Peru	O	O	O				O	O		O		O	O
Philippines	O	O	P				P						
Poland	O	O											
Portugal	O	O					O						
Republic of Korea	O	O	O		O	O/P	O					O	O
Réunion (France)						O		O					
Romania	O	O	O				O						
Russian Federation	O/T	O/T		O		O/P	O/T	O	O	O		O	O
Saudi Arabia	O	O					O					O	O
Senegal	O	O											
Seychelles							O						
Singapore	O	O		O	O		O			O		O	O
Slovenia	O	O											
South Africa			O				O/P	O	O	O		O	O
Spain	O	O	O/P			O	O	O		O		O	O
Sweden	O	O				O	O						
Syrian Arab Republic	P	P	P				O						
Thailand	O	O	O				O			O		O	O
Tunisia													

Appendix B Status of Navtex systems of Member states on the GISIS Portal

ANNEX 7
NAVTEX SERVICE

NAV/MET Area	Country	NAVTEX Coast Station	Position of Antenna	Range (NM)	B1 Character	Transmission times (UTC)	Language	Status of Implementation
			International 518 kHz					
I	Belgium	Oostende Radio	51° 10.95' N 2° 48.47' E	55	T	0310,0710,1110,1510,1910,2310	English	Operational
I	Belgium	Oostende (Thames Approaches broadcast for United Kingdom)	51° 10.95' N 2° 48.47' E	150	V	0330,0730,1130,1530,1930,2330	English	Operational
I	Estonia	Tallinn	59° 27.84' N 24° 21.42' E	250	F	0050,0450,0850,1250,1650,2050	English	Operational
I	Faroes, Denmark	Torshavn Radio	62° 00.87' N 6° 47.45' W	300	D	0030,0430,0830,1230,1630,2030	English	Operational
I	France	Cross Corsen	48° 28.56' N 5° 03.18' W	300	A	0000,0400,0800,1200,1600,2000	English	Operational
I	Germany	Pinneberg	53° 40.50' N 9° 48.50' E	250	S	0300,0700,1100,1500,1900,2300	English	Operational
I	Iceland	Reykjavik Radio / Saudanes	66° 11.17' N 18° 57.12' W	450	R	0250,0650,1050,1450,1850,2250	English	Operational
I	Iceland	Reykjavik Radio / Grindavik	63° 49.99' N 22° 27.04' W	450	X	0350,0750,1150,1550,1950,2350	English	Operational
I	Ireland	Valentia	51° 56.00' N 10° 21.00' W	400	W	0340,0740,1140,1540,1940,2340	English	Operational
I	Ireland	Malin Head	55° 21.80' N 7° 20.39' W	400	Q	0240,0640,1040,1440,1840,2240	English	Operational
I	Netherlands	Netherlands Coastguard Radio (PBK)	52° 55.06' N 4° 44.34' E	250	P	0230,0630,1030,1430,1830,2230	English	Operational
I	Norway	Rogaland Radio	58° 38.92' N 5° 36.58' E	450	L	0150,0550,0950,1350,1750,2150	English	Operational
I	Norway	Ørlandet	63° 39.70' N 9° 32.80' E	450	N	0210,0610,1010,1410,1810,2210	English	Operational
I	Norway	Jeloya	59° 26.08' N 10° 35.48' E	200	M	0200,0600,1000,1400,1800,2200	English	Operational
I	Sweden	Bjurröklubb	64° 27.71' N 21° 35.47' E	300	H	0110,0510,0910,1310,1710,2110	English	Operational
I	Sweden	Gislövshammar	55° 29.38' N 14° 18.87' E	300	J	0130,0530,0930,1330,1730,2130	English	Operational
I	Sweden	Grimeton	57° 06.32' N 12° 23.36' E	300	I	0120,0520,0920,1320,1720,2120	English	Operational
I	United Kingdom	Cullercoats	55° 04.48' N 1° 27.79' W	300	G	0100,0500,0900,1300,1700,2100	English	Operational
I	United Kingdom	Portpatrick	54° 50.64' N 5° 07.47' W	300	O	0220,0620,1020,1420,1820,2220	English	Operational
I	United Kingdom	Niton	50° 35.18' N 1° 15.29' W	300	E	0040,0440,0840,1240,1640,2040	English	Operational
I	United Kingdom	Niton (NE Coast of France and Channel Islands broadcast for France)	50° 35.18' N 1° 15.29' W	300	K	0140,0540,0940,1340,1740,2140	English	Operational
II	Cabo Verde	Sao Vicente Radio	16° 51.24' N 25° 00.14' W	250	U	0320,0720,1120,1520,1920,2320	English	Temporarily suspended
II	France	Cross Corsen	48° 28.56' N 5° 03.18' W	300	A	0000,0400,0800,1200,1600,2000	English	Operational
II	Nigeria	Lagos	6° 23.99' N 3° 22.91' E	250	S	0300,0700,1100,1500,1900,2300	English	Planned or to be decided
II	Nigeria	Oron	4° 48.01' N 8° 15.34' E	250	H	0110,0510,0910,1310,1710,2110	English	Planned or to be decided
II	Portugal	CENCOMARACORES (S.Miguel)	37° 48.50' N 25° 33.20' W	300	F	0050,0450,0850,1250,1650,2050	English	Operational

Appendix C Status of Cospas Sarsat MCC and LUT in Nigeria on the GISIS Portal